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"A Horror of Abstract Thought": Postwar Britain and Hamilton's 1951 *Growth and Form* Exhibition

ISABELLE MOFFAT

Richard Hamilton's well-known *Just What Is It That Makes Today's Homes So Different, So Appealing* (1956) is generally taken as a document for the existence of a kind of proto-Pop art coming out of England from what has come to be known as the Independent Group.[1] It's taken to mean different things according to the narratives that it serves: the preoccupation of postwar artists with everyday life, the invasion of the home by popular culture, the integration of mass-cultural material into art, consumer fetishism, or its critique. Of course, by now, it has been frequently pointed out that this collage was not intended as an art object, but produced as a poster and an illustration for the catalog for the 1956 exhibition *This Is Tomorrow,* and not itself exhibited until 1964—well into the heyday of Pop art—when it was shown alongside recent paintings in Hamilton's first solo show at the Hanover Gallery; and that the pieces from which the collage was assembled were cut out by Hamilton's wife, Terry, and Magda Cordell from a "treasure chest" of American magazines brought back recently by John McHale from a stay at Yale to a color-starved and austere England, hence neither the imagery nor the products were everyday, but distinctly associated with the affluence and cultural influence of the United States.

Readings of the image's position toward consumerism largely turn on this discrepancy of demand and supply. In the discussions of the IG, historians have responded to the ambiguity between affirmation and critique—which as a constitutive and legitimizing tension is crucial to Pop art, both American and British—by focusing on the specific historical situation of the IG meetings, which largely fall into a period of austerity and economic hardship after Britain's exhaustive war effort. Hence it is often assumed that the IG's focus on consumerism was the

1. Like so many groups of that period, roughly the immediate postwar decade, the Independent Group (IG) was a transient formation and the use of the term suggests a much greater coherence than it actually had. In fact, it was a group of artists, architects, and critics who for a short period came together semi-officially to discuss the role of popular culture in postwar art practice.

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expression of a frustrated desire, a dreaming out loud or perhaps a wish list. This interpretation, based largely on Group Two's exhibit at *This Is Tomorrow,* Hamilton's later Pop paintings, and Paolozzi's *Bunk!* collages, ascribes a certain naiveté and blind progressivist notion to the work of these artists, while avoiding the political connotations of such consumerist desires.

On the other side of this dichotomy between longing and contempt falls an interpretation that, on the contrary, ascribes a sly level of sophistication to the IG and their critique of the postwar consumer society. Whereas the first view is based on historical circumstances, buttressed by a few IG reminiscences about the drabness of postwar London, the later interpretation is almost exclusively based on the IG's own comments from the early 1960s attesting to their "working-class" opinions, their left-leaning politics, and the ostracism they experienced on account of their introduction of popular culture into a fine arts context—in short, their subversive intent of undermining elitist hierarchies of art production. My project originated in a frustration with the tautological tactics of both of these interpretations.[2]

My objective is to go beyond a description of postwar Britain, one that would explain the attraction of the glitz and glamour of American pop culture to the IG, or even beyond a reading that would analyze the political connotations of the choices in their ideologically charged climate (although such a reading is implicit in some of the arguments that follow). I am not interested in drawing a picture of the times in order to understand the IG's work, but in doing the reverse: examining the intellectual tools supplied to the IG that determined the way in which—in the early 1950s—they approached the issues of perception and communication

2. An assessment of the IG has been complicated by some of the members of the group, who were themselves actively engaged in the interpretation of their own past. There has been a lingering unease on account of inherent contradictions in the group's exclusively retrospective accounts of their positions in the 1950s. This time lag between their original activities in the early 1950s and their later commentaries is significant because of the major shift in British social and cultural history that occurs between 1950-56, and which presumably colored their recollections. It is in this light that one regrets that there are only scant and conflicting contemporaneous notes from the meetings themselves, their attendance, and topics. There are texts from Hamilton, Alloway, Paolozzi, and the Smithsons written after 1955, many of which were never published until the following decade, often heavily edited as in Hamilton's case. Or there is the famous 1956 letter of Hamilton's that typically accompanies discussions of his collage and includes his list "Pop art is . . .," which he claims to have sent to the Smithsons, though they have continuously insisted they never received it. And then there are the reams of interviews conducted with the IG since the early 1960s for TV documentaries, books, and dissertations; these draw a tendentious, back-stabbing, and gossipy, but not altogether very reliable, picture of the period.

But another reason for skepticism towards the IG's own texts is that their art-historical role has largely rested on their antecedence to Pop art, not on any actual work produced. This has contributed to a certain jostling among the members of the group. Artists, such as Hamilton, Paolozzi, Henderson, and Cordell, had respectable careers, and Alloway, Banham, and del Renzio, the group's writers, were able to establish themselves; still, none of them ever lived down their role as founding fathers of Pop.

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that shaped their attitudes toward visual culture. When I propose taking into account the tools, I am not suggesting the kind of art-historical archaeology that traces individual images to their source. The work that looks at the group's indebtedness to Sigfried Giedion's *Mechanization Takes Command* (1948), Moholy-Nagy's *Vision in Motion* (1947), or individual American advertisements and science-fiction movies has already been done.[3]

Instead, I examine the hybrid trains of thought—mixed from parts logical positivism, psychology, and physics—that saturated both the IG's intellectual milieu and British exhibition practice on the whole. Looking at the historical circumstances of the immediate postwar period in Britain and sketching out the political climate and the social utopia that the *Festival of Britain* (1951) sought to propagate, it becomes clear that the models of perception, psychology, and language from which the *Festival* operated are intimately related to the IG's search for an artistic language capable of expressing precise meanings relevant to the postwar world.

The didactic intentions, for example, and the idealistic belief that a spectator could be "educated," could be made to perceive, to understand a *right,* fixed, intentionally communicated message, clearly inform the *Festival* as well as much of the IG's work, and especially Hamilton's two exhibitions—*Growth and Form* (1951) and *Man, Machine, and Motion* (1955). By putting Hamilton's exhibitions into the larger context of several postwar didactic photographic exhibitions, I want to reveal the operative assumptions about visuality that determined his attitude not only toward science and technology but toward mass culture as well. The notion of the directness and immediacy of visual perception attracted the IG to advertisements and popular culture, which they considered "pure" communication. They admired the use of scientific research, i.e., market research, communication theory, and psychological means of manipulation, namely, the way in which the newly professionalized advertisement industry used "science" to reach its audience. There is, of course, a prewar history of photo exhibitions,[4] but there are also

3. See, for example, Jürgen Jacob, *Die Entwicklung der Pop Art in England . . . von ihren Anfängen bis 1957—Das Fine-Popular Art Continuum* (Frankfurt: Peter Lang, 1986); Dawn Leach, *Richard Hamilton: The Beginnings of His Art* (Frankfurt: Peter Lang, 1993); Anne Massey, *The Independent Group: Modernism and Mass Culture in Britain, 1945-1959* (Manchester and New York: Manchester University Press, 1995); *The Independent Group: Postwar Britain and the Aesthetics of Plenty,* ed. David Robbins (Cambridge: MIT Press, 1990); and Graham Whitham, "The Independent Group at the Institute of Contemporary Arts: Its Origins, Development, and Influences 1951–1961" (Ph.D. diss., University of Kent at Canterbury, 1986).

4. A few major examples: the avant-garde Abstract Room in Hannover from 1925 by El Lissitsky; his 1928 "Pressa" Russian Pavilion in Cologne; the 1927 wall for a propaganda agency by the Rasch brothers; the AEG Pavilion in Barcelona (1929); the Deutscher Werkbau exhibit at *20e exposition des artistes decorateurs francais* (1930; especially the part designed by Bayer); Max Bill's Swiss section at the 1936 Milan Triennale; Le Corbusier's photo-wall at the Exposition in Paris in 1937; and Alvar Aalto's Finnish Pavilion at the 1939 New York World's Fair.

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direct connections to wartime propaganda shows such as Herbert Bayer's "The Road to Victory" or other smaller traveling exhibits organized, for example, by Misha Black, in Britain.[5] Here again the *Festival of Britain* constitutes an important link as many of its organizers had been active in wartime propaganda agencies but also had close ties with art schools in the early 1950s.[6]

An analysis of *Growth and Form,* the first exhibition generally associated with the work of the IG, but largely conceived and curated by Hamilton (and of the symposium, "Aspects of Form," that accompanied the exhibit) can trace the absorption into the overall aspiration "to be scientific"—emblematic of the post-war climate—of the faith in an objective truth, in a verifiable fact that guides Hamilton in his penchant for photographic reproduction, especially microscopic photography and diagrammatic depictions. A privileging of visual perception, as the most objective sense, goes hand in hand with this belief in a kind of clarity of cognition that discounts ambiguity and connotative meaning as esoteric. Such a model of cognition as an unambiguous act with clear rules of engagement, falling under conditions of verifiability, is partially rooted in the "abhorrence of abstract thought" George Orwell ascribes to the British in his 1941 *The Lion and the Unicorn,* or, more dispassionately put, it concurs with the vogue for logical positivism in Anglo-American philosophy in the 1950s.[7]

5. In 1943 Bayer's show also traveled to London.

6. One meeting place for such a link between Festival designers and architects and art school was the student-run journal *Ark,* in which the IG published several texts after 1956. For an in-depth discussion of *Ark* see Alex Seago, *Burning the Box of Beautiful Things: The Development of a Postmodern Sensibility* (New York: Oxford University Press, 1995).

7. Originating in Austria and Germany in the 1920s, logical positivism drew its force from decisive mathematical and scientific discoveries in that period. Albert Einstein's theory of relativity and mathematician Kurt Gödel's incompleteness theorems, in particular, marked a new age, and the philosophers and thinkers associated with the Vienna Circle, as these positivist thinkers came to be called, were deeply involved with these disciplines. They were also, according to Michael Friedman, "actively involved with the revolutionary sociocultural and political struggles of the period and, in particular, with the movement for a neue Sachlichkeit in both society and the arts typified by the Dessau Bauhaus. . . . The logical positivist movement [thus] was not only identified with Einsteinian physics and modern abstract mathematics, but also with socialism, internationalism, and 'red Vienna.'" See *Reconsidering Logical Positivism* (Cambridge: Cambridge University Press, 1999), p. xi. For the connections between the Vienna Circle and the Bauhaus, especially through Otto Neurath and Rudolf Carnap, see Peter Galison, "Aufbau/Bauhaus: Logical Positivism and Architectural Modernism," *Critical Inquiry* 16 (Summer 1990), reprinted in *The Legacy of the Vienna Circle: Modern Reappraisals,* edited with introductions by Sahotra Sarkar (New York: Garland Publishing, 1996), pp. 77-120.

Many of the leading proponents of logical positivism had to flee Germany in 1933 and emigrated to the U.S. or Britain. Much of the revolutionary fervor was lost in this emigration; overtly Marxist overtones were hushed in the new guest countries; and the logical positivists became, as Friedman puts it, "respectable (and domesticated) practitioners of the new subdiscipline of philosophy of science" (Friedman, p. xiv).

By the 1950s much of their program had been popularized in a manner that ultimately doomed it, since it "became identified with a rather simpleminded version of radical empiricism" (Friedman, p. xiv). In his study, Friedman mentions the immensely successful popularizer in Britain, A. J. Ayer, who

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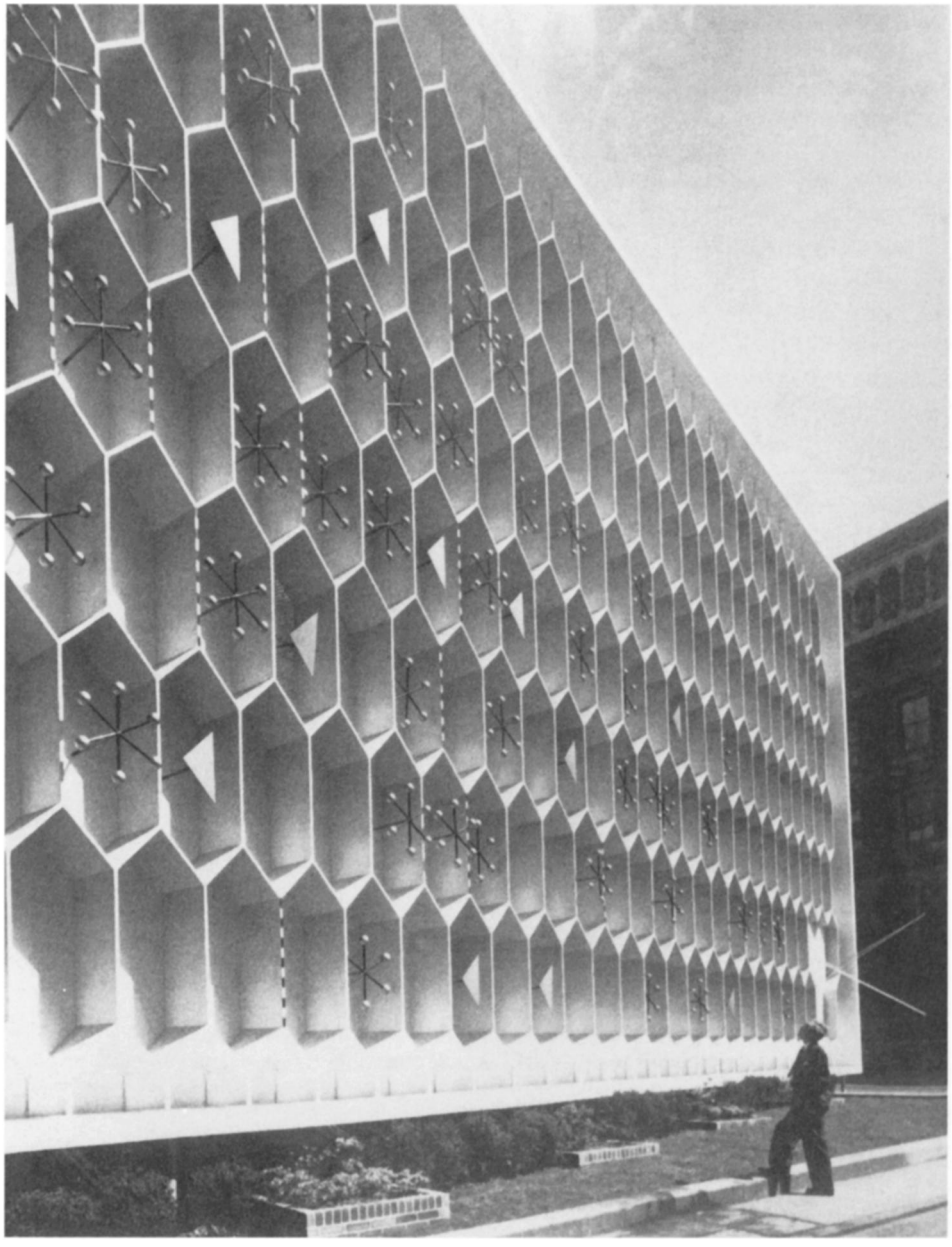

Brian Peake. Screen at the entrance to the Science Museum Exhibition, based on the carbon atom. The hexagonal aluminum units were designed by Gordon Andrew in pale blue and yellow, with arrow motifs in red. Science Exhibition, *Science Museum, South Kensington. 1951.*

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As the event that best embodied the postwar progressivist, scientistic spirit, and the overwhelming domination of the popular imagination by the mirage of a social utopia, the *Festival*, with its concerted attempt to translate very specific ideas into predominantly visual displays, offers a view of contemporaneous models of spectatorship and communication. Among the *Festival of Britain*'s many displays and exhibits, the *South Kensington Science Exhibition* was perhaps most intensely infused by the attitudes toward perception, communication, and science consistent with the contemporaneous philosophical discourse of logical positivism and the resultant scientistic view of communication.

The purpose of my comparison of Hamilton's *Growth and Form* exhibition with the *South Kensington Science Exhibition* is not merely to establish a formal similarity in exhibition design and imagery. Nor is it to claim, as Jürgen Jacob does in his study of the IG, that the group simply learned to collaborate, learned to value "aesthetic unity," from the *Festival*'s inclusive organizational principle. Rather, I want to show the shared assumptions inherent in their attempts to transmit unambiguous and incorruptible messages through visual imagery and their common emphasis on creating environments to control the spectator's perceptions.

To understand this confidence in the ability to convey meaning directly one has to consider the models of perception and communication guiding these exhibitions along with the postwar euphoria and social optimism that brought about their didactic fervor.

Britain's circumstances after World War II were very different from those of its European neighbors and the other victorious allies, the Soviet Union, and the United States. The dissolution of the Empire, which had already begun before the World War I, was reaching its final stage, forcing Britain to negotiate a new relationship with its former colonies and to acknowledge a new self-image as a waning

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played some role in the IG's intellectual milieu. Ayer was on the first list of lectures the IG proposed to the ICA committee at the beginning of their meetings, and he subsequently gave a talk on "The Principle of Verification" at an IG meeting in 1952–53. Here is Friedman's somewhat polemic summary of Ayer's position: "At the very center of positivist thought, according [to Ayer's 1936 popularization *Language, Truth and Logic*], is the notorious principle of verifiability, the principle that only propositions having direct implications for sensory experience are 'cognitively meaningful.' All other propositions, not only those of traditional metaphysics, but also those of ethics and religion, for example, are now declared to be devoid of such meaning. And, by the same token, a naively empiricist conception of natural science, now conceived as the paradigm of cognitively meaningful discourse, is the natural and inevitable complement to this view; because all of our theories in the natural sciences, no matter how complex and abstract they may appear, are now understood as elaborate devices for recording and systematizing our sensory experiences. Natural science as a whole thus is understood, in the end, as simply the continuous accumulation of more and more observable facts" (Friedman, p. xiv). Ayer's advocacy of logical positivism was fairly influential in postwar Britain. Moreover, this influence of (Ayer's) logical positivism shows many traces in the IG's conception of communication and its attitudes toward science, scientific knowledge, and imagery. Apart from the direct contact the IG sought to Ayer, exposure to logical positivism, psychology, and language theory can also be recovered in their sources, particularly in Giedion and Moholy-Nagy's work (compare Galison's "Aufbau/Bauhaus").

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world power. Britain had entered the war in a weak economic condition and could not afford the financial responsibilities that went with its territories.[8]

The need for social reform, widely recognized in the early 1940s and, according to historian Alan Sinfield, considered urgent enough that "some members of the governing elite feared revolution if the war did not result in social justice. . . . Radical social change was generally anticipated,"[9] was finally addressed during World War II by various committees that were asked to find solutions for the condition of the nation. Three reports—those of William H. Beveridge, R. A. Butler, and Augustus A. Uthwatt—were drawn up for the government to address the three most frequently voiced concerns: health and unemployment insurance, education, and legislation preempting real-estate speculation and war profiteering. The Uthwatt Report "suggested a new scheme for comprehensive land-use planning, designed to prevent speculative profit making during the post-war reconstruction and to ensure public control over proposed building developments."[10] The Butler Report, released in 1944, called for free and compulsory secondary education for all. It was, however, the third report that proved most influential in shaping the postwar state; Sir William Beveridge's proposal for national insurance against unemployment and sickness became the blueprint for the postwar welfare state.

The initial promises of the newly founded welfare state, created after Labour's electoral victory of 1945, however, were difficult to keep in a climate of financial crises and rationing of foodstuff and building materials. The utopian aspirations of classlessness and affluence for all were believed in, contrary to the evidence, until impatience and a kind of malcontent restlessness set in beginning around 1948–49, as Britain's situation became more precarious and the hoped-for change appeared to falter under the reality of postwar economics and the stubbornness of traditional social structures.[11]

Carefully orchestrated events, such as the propaganda and trade fairs, were staged—often by leftover war agencies—to give a sense of direction to the war-torn nation and to rescue national pride as colonial power continued to erode.

8. In 1938 the national debt had amounted to £7,000 million and by 1945 it increased to £23,000 million. The large loans from the United States that kept the British economy afloat symbolized its dependence on the newly emergent superpower and contributed to the sense of unease and occasional resentment of this unequal relationship. In 1945 alone, the U.S. lent $3,750 million and, when that loan began running out, the Marshall Plan provided further, much-needed large-scale assistance to the British economy. See Alfred F. Havighurst, *Britain in Transition* (Chicago: University of Chicago Press, 1979), p. 391.

9. Alan Sinfield, *Literature, Politics, and Culture in Postwar Britain* (Berkeley: University of California Press, 1989), pp. 10, 14.

10. Alan Sinfield, ed., *Society and Literature 1945–1970* (New York: Holmes and Meier, 1983), p. 14.

11. For an analysis of Labour's rule and the change in mood circa 1948–49 see Martin Francis, *Ideas and Policies under Labour 1945–1951: Building a New Britain* (Manchester: Manchester University Press, 1997).

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The postwar situation called for a new Britain, and these popular exhibitions attempted to help create this unspoiled self-image amid calls for steadfastness in the face of rationing and lack of housing. In order to encourage the exhausted citizenry in its struggle, the 1951 *Festival of Britain* celebrated English history as well as postwar British achievements. For that purpose the *Festival* was organized around themes that were considered most crucial to British identity: the history of the islands and its inhabitants; agriculture, seafaring, scientific, and technological innovations by British scientists; civic culture (public architecture, art and music); taste ("good design" and craft); and British whimsy. The ongoing scarcity and—in retrospective statements almost mythical—drabness made it desirable to celebrate a new, modern Britain, to remind Britons of old glory and of their perseverance throughout the past war, and to begin to articulate the image of postwar Britain striding confidently into the future—in times of war scare and high cold war anxiety.

What makes the *Festival* so significant as a cultural and political marker is its uneasy position in a transitional period in postwar British history, "the contradictions, between the situation for which the *Festival* was intended and the situation in which it emerged, and between the advertised purposes of the *Festival* and its actual effects."[12] During the years leading up to the event in 1951, the *Festival* came to stand for the new Britain, and yet it was used in political arguments by advocates of contesting visions of the future.[13] For at the same time that the *Festival* intended to make an image of Britain in the socialist dream that the Labour government had been trying to implement since 1945, it also exemplified the ease with which the Conservative Party coopted the myth of classlessness and Britain's "New Society" when it regained governmental control after the 1951 elections.

After World War II there had already been several state-sponsored exhibitions that cheered on the nation, such as, for example, *Britain Can Make It* at the Victoria and Albert Museum and *How Goes Britain* (1948), *The Londoner's England* (1946), and an abundance of government-sponsored trade fairs showcasing achievements in specific fields, such as *Chemistry at Your Service* (1946), *Women's First Electrical Exhibition* (1945), or the *Jet Exhibition* (1947). The *Festival of Britain* then came to mark the end of an era which had perhaps begun as an outgrowth of idling wartime agencies: "the exigency of war propaganda," wrote architect Misha Black in 1950, "has created, in this country, experience in the informative and story-telling type of exhibition . . . which equals in quantity that which the Fascist countries enjoyed, with the added distinction of experience in the democratic

12. Adrian Forty, "Festival Politics," in *Tonic to the Nation—The Festival of Britain,* ed. Mary Banham and Bevis Hellier (London: Thames and Hudson, 1976), p. 26.
13. For a detailed history of the political debates leading up to the *Festival of Britain,* see Michael Frayn, "Festival," in *Age of Austerity,* ed. Michael Sissons and Philip French (London: Hodder and Stoughton, 1963).

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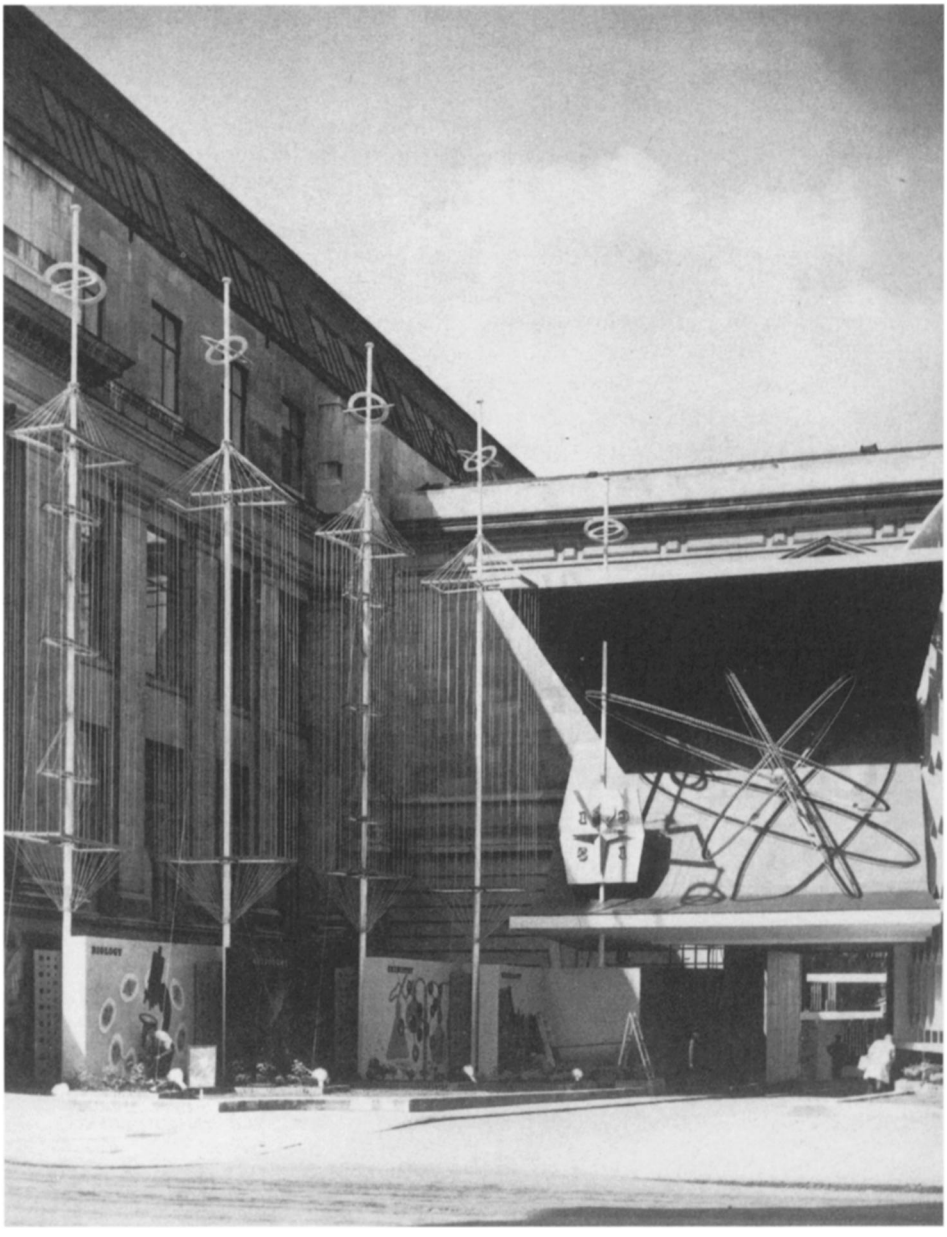

Entrance of the Science Exhibition, *nearing completion. 1951. The aluminum screen is visible on the right.*

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method of propaganda by factual information instead of the Nazi hysteria-stimulating technique."[14] Black, who was a member of the *Festival* Presentation Panel and Design Group and in this capacity had a decisive influence on the concept, planning, and execution of the *Festival*, had already in 1946 used comparisons with propagandistic events such as the 1935 Jubilee celebrations and a Nazi rally at Nuremberg from the same year to consider the conceptual underpinning of successful exhibition design. While the apparent eagerness to align his exhibitions with these counterparts strikes one as misguided, his confidence in his didactic project, the confidence that "democratic method" will have democratic results, is very much of the time.

Like many institutions in London and around the country, the Institute of Contemporary Arts (ICA), with which members of the IG were already involved, actively participated in the *Festival of Britain.* The ICA organized two exhibitions that loosely corresponded to the *Festival*'s themes of national stock-taking, good-natured technological optimism, and vernacular scientism. One of them was a historical survey entitled *Ten Decades—A Review of British Taste 1851-1951*, duly recalling the earlier *Great Exhibition* which, with the immense image-making success it had provided England in the previous century, originally inspired the *Festival*, before the circumstances forced a national rather than international celebration of a new Britain.

The ICA's first exhibition to open during the *Festival* summer, though, was the rather less conventional one-room installation largely conceived and executed by Richard Hamilton, *Growth and Form.* Like his later show *Man, Machine, and Motion*, *Growth and Form* was an attempt to make the modern spectator aware of the changes that human life, and with it human perception, had undergone. *Growth and Form*, as Hamilton later said, "dealt with the natural world" whereas *Man, Machine and Motion* was "a survey of appliances invented by men to overcome the limits imposed on them by the physical attributes provided by nature,"[15] in other words, *Growth and Form* explored the impact of science on our perception of nature, *Man, Machine, and Motion* the impact of technology on our perception of the moving world.

As has been pointed out by various critics, including the artist himself, D'Arcy Wentworth Thompson's book *On Growth and Form* not only gave the exhibition its title, but was also a major influence on Hamilton. Graham Whitham notes that "Hamilton had been introduced to the book by Nigel Henderson and, indirectly, by Eduardo Paolozzi."[16] The former's endorsement was an important one

14. Misha Black, "Exhibition Design," in *Exhibition Design,* ed. Misha Black (London: Architectural Press, 1950), p. 11.
15. Richard Hamilton, *Collected Words: 1953–1982* (London: Thames and Hudson, 1982), p. 18.
16. Graham Whitham, "The Independent Group at the Institute of Contemporary Arts: Its Origins, Development, and Influences 1951–1961" (Ph.D. diss., University of Kent at Canterbury, 1986), p. 46.

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for Hamilton and Paolozzi, since Henderson's connections through his mother, who had been the director of Peggy Guggenheim's London gallery, Guggenheim Jeune, before the war, represented a link for these young artists to the European avant-garde of the previous generation. Originally published in 1917, Thompson's book had been republished in 1942 in a second edition heavily edited and expanded by the author. By mid-decade it had become one of those books passed around in American and European avant-garde circles,[17] and, according to Whitham, had "helped to substantiate the notion 'that there were fundamental proportions and rhythms inherent in all forms of life.'"[18] Most references, though, are made to the illustrations in Thompson's book or to the main tenet of the voluminous philosophico-scientific treatise, numbering 793 in its first edition and 1,116 pages in its second. The photographs and diagrams of microorganisms and cell structures struck a chord with contemporary interests in the origin of form. And the thesis—in Stephen Jay Gould's succinct and blissfully short summary: a "hybrid theory of Pythagoras and Newton [that] argues that physical forces shape organisms directly . . . and that the ideal geometries beloved by classical Athens pervade organic form because natural law favors such simplicity as an optimal representation of forces"[19]—promised the possibility of perhaps understanding the building blocks of form in nature as well as in art.

Many of the sources for both the concept and the exhibition design for *Growth and Form* have been enumerated by Hamilton, and he has never made a secret of his indebtedness to other artists, books, or ideas. Rather, he took pride in his own voracious interdisciplinary appetites. True to the scientistic spirit of his times ("everybody wants to be a scientist") Hamilton's treatments of D'Arcy Thompson's book in his several proposals to members of the ICA exhibition committee have the earnestness of a dutiful student. Hamilton took seriously the role of the artist and of the designer in facilitating the education of the consumer/spectator. His admiration for the professionalism and the new type of knowledge of the "Adman" constituted a consistent theme in his self-realization as an artist and an integral part of his art.

Hamilton's draft schedule for the show from 1950 was very ambitious. Closely following the structure of Thompson's book, Hamilton intended to divide the show into seven distinct sections, each visualizing the physical laws of form laid out by Thompson. His section headings read, "1. Time as a dimension of form; 2. Forms of cells; 3. Cell groupings; 4. Skeleton structure; 5. Related forms; 6. Form and mechanical efficiency; 7. The formal realisation of pure mathematics."[20] But

17. See, for example, the recent Tony Smith catalog (New York: The Museum of Modern Art, 1998).
18. Ibid., p. 46. Whitham is quoting Charles Harrison, *English Art and Modernism 1900–1939* (London and Bloomington: Indiana University Press, 1981), p. 282.
19. Stephen Jay Gould, "Introduction," *On Growth and Form*, p. xi.
20. ICA Papers, Tate Gallery Archive TGA 955.1.12.26; reprinted in Jacob, *Die Entwicklung der Pop*

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Hamilton had to scale down the show once it was clear that adequate funding and a larger exhibition space couldn't be arranged, and much of the exhibition was built by him and his friends, giving it a somewhat self-made look.

For my analysis it is not so important what Hamilton looked at in his two-year research for *Growth and Form*, but why. He has been quite thorough in naming his sources and, again, the work that traces the show's iconography back to its sources in Giedion, Moholy-Nagy, Klee, or Duchamp has been done. But even Hamilton's detailed treatment on D'Arcy Thompson in his proposal to the ICA selection committee tells us very little about the reasons for his interest in this book. Of course, there is the book's legendary status among avant-garde artists, yet looking at the book today it is difficult to imagine what fascinated these artists so intensely. In his first proposal written for Herbert Read in 1949, Hamilton discussed the importance Thompson's book had for him and how he wanted to translate the book's key principles visually. Hamilton's lively interest in form and in the laws of its creation and his confidence in finding answers in Thompson's theses come across at once: "The initial stimulus for the proposed exhibition was provided by Thompson's book *On Growth and Form*. The visual interest of this field, where biology, chemistry, physics and mathematics overlap was considered an excellent subject for presentation in purely visual terms. The laws of growth and form pertaining to the processes of nature are quite contrary to the processes of artistic creation. However complex the form (excepting Thompson's hypothesis) it is the result of very precise physical laws; the complexities of art, on the other hand, are the products of involved psychological processes."[21] What is at stake here for Hamilton is the difference between art and organic form and the processes of their creation. "The complexities of art," as he says, "are the products of involved psychological processes"; organic form, however, is free of psychology and intentionality. Hamilton is drawing a distinction between the naturalness and inherent laws of necessity underlying organic creation, represented in *Growth and Form* by photographic depictions taken from the world of science, and the deliberately created work of art. Moreover, the images themselves, produced by scientists with scientific apparatuses, are considered entirely in visual terms. Cleansed by science, Hamilton suggests, these forms are free of any connotative meanings and guarantee a kind of directness that he sought also to translate his art.

In *Growth and Form* Hamilton wanted to dissect form—from the smallest structures, such as atoms and cells, to larger ones, like skeletons, sponges, and

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Art, p. 168. The list of suggested contributions for Section 5, "Related forms," explains "spirals, Geodesics, Mollusk shells, horns, Phylotaxis, Eggs."

21. "Growth and Form Exhibition, First Draft Schedule," ICA Papers, Tate Gallery Archive TGA 955.1.12.26; reprinted, albeit with many spelling mistakes, in Jürgen Jacob, *Die Entwicklung der Pop Art*, p. 166 (Jacob dates it 1949; the pages have no date but the cover page preceding the text in the file reads "20 December 1950").

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shells—and show how precise mathematical and physical laws of necessity determined it. He believed that "the painter and the sculptor [had] much to gain from the enlargement of their world of experience by an appreciation of the forms in nature beyond their immediate visual environment. It is the enlarged environment opened by scientific studies that we would reveal for its visual qualities."[22] Hamilton is seeking inspiration in scientific imagery, which he considers, in contrast to the work of art, unmediated. From an "enlargement of [his or her] world of experience," *Growth and Form* suggests, the artist can draw this immediacy of address, this notion of authentic modern form.

Hamilton's idea of an enlarged visual realm is sounding, again, almost Benjaminian, but closer to his own intellectual environment is both the "New Landscape" of MIT professor and head of that school's Department of Visual Design Georgy Kepes—a heretofore invisible realm, it is implied, made visible by the microscope—and industrial designer George Nelson's "Enlargement of vision." Nelson's article, published in the British magazine *Interiors* in 1951, sounded another voice in the call to understand modern man by looking at his environment and conversely to influence modern man by enlarging his "storehouse" of images. Nelson's premise is that the intake of imagery changes man, and not only his aesthetic or his imagination and his sense of form, but his social self as well. Seeing "correctly" takes on greater importance when, as it is in Nelson's piece, mastery of the contemporary world is said to be at stake: "without vision we the people perish," he quotes.

> Our vision is cluttered with retained images and it is too narrow. It has been my own experience that to begin to approach an awareness of the shapes of our time requires an extraordinary intellectual and emotional effort. Enlargement of vision is one of the most difficult assignments an individual can assume and the revision of habitual modes of thinking is no easier. Perhaps it is only the isolated genius who can ever see past the bare outlines of the age in which he lives: nevertheless, the effort is necessary for the common man, not only for survival, but for creation.[23]

Nelson is, admittedly, addressing designers and architects, but his aim is wider and includes "the average citizen" who carries in his mind a "preconceived" image of the world, which needs to be changed in order for humanity to survive. And this change, it is suggested, can be brought about by visual re-education.

22. "Growth and Form Exhibition, First Draft Schedule," ICA Papers, Tate Gallery Archive TGA 955.1.12.26; reprinted in Jacob, p. 166.
23. George Nelson, "Problems of Design: the Enlargement of Vision," *Interiors* 111, no. 4 (November 1951), p. 107.

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Left. The Dome of Discovery, Festival of Britain, *South Bank, London. Architect Ralph Tubbs, engineers Freeman Fox & Partners, displays designed by Design Research Unit, coordinating designer Misha Black. 1951.*

Right: Science Exhibition, *Science Museum, South Kensington, as seen from the viewing platform. Architect and coordinating designer Brian Peake. 1951.*

Hamilton's arrangement in *Growth and Form* of photographs, drawings, models, and films of "atomic particle traces, crystal structures, chromosomes and cell divisions, marine larvae, skeletal structures, plant forms, and more presented on a free-standing frame system as well as on walls, ceiling and floor"[24] might be seen as part of such a re-education. He thought of his exhibitions as "didactic," even if retrospectively he began calling them "installations," and he continued to stress his effort for an education of the viewer by *"forcing"* them to see. Judging from installation shots, it appears that the spectator must have had some sense of descending into cell structures themselves—a distinctly surreal impression of being reduced to the size of blood cells and wandering among multiplying minute organisms and cell clusters. One contemporary reviewer, quoted by Whitham, noted the darkness of the exhibition space, in which "shapes and forms move on screens on the ceilings or on the floor. Projected on the ceiling was the drama of crystal formation; on another screen, sea urchin's eggs divided themselves."[25] The sense of dislocation and spatial confusion that radiates from this reviewer's description is repeated in the visual and spatial tricks that will dominate Hamilton's later contri-

24. Whitham, p. 45.
25. Ibid., p. 46.

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bution to *This Is Tomorrow.* But even more striking are the parallels to the science exhibition at the *Festival of Britain,* where darkened rooms immersed the spectator in the human-sized cellular projections and forcefully confronted the viewer with organic matter, some to identify with on a cellular level.

The *Exhibition of Science* at the Science Museum in South Kensington, organized in concurrence with the *Festival* but located away from the Southbank site, attempted both to show British scientific achievement and to make science appear "friendly." It constitutes a valuable source in unpacking attitudes toward scientific knowledge in the early 1950s and examining attempts to influence an audience. In its first few sentences, the introduction to the "guide-catalogue" for the science exhibition addresses the fears "the public" is believed to have, and then continues to stress the democratic nature of science:

> People are often tempted to draw a more romantic picture of science: to see it as something remote or frightening, a magic and a mystery. Science is none of these things. Science is knowledge.
>
> Nor is science a strange and a special kind of knowledge. Its underlying ideas are not difficult and not at all extraordinary. They can be understood and enjoyed by everyone. This is an exhibition for everyone, in which the ideas of science are shown as common knowledge. Nothing in this exhibition, therefore, is meant to puzzle or astonish.

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> There are no trick miracles here, and no mechanical marvels. Instead, here is the modern world itself, standing straight and handsome on its base of science.[26]

The calming tone and simple language of this passage have an almost hypnotic quality, highlighting the fears of the organizers: to startle, deceive, or alienate. In their strained effort to erase the tainted image of scientific knowledge resulting from the association with the destructive potential of nuclear weaponry and the applications to which science had been put in Nazi Germany, the organizers portray science in the most unthreatening terms possible. It was particularly the nuclear connotations that the *Festival of Britain* and the Science exhibition were trying to break, as the cold war was fanning fears of "The Bomb."

Apart from its transparency, another argument for the integral and benevolent role of science for humanity is made via its association with nature. Scientific knowledge is "naturalized" by asserting it as a building block of life and as enlightening and freeing man, lightening his burden, making him more human. Lastly, science is domesticated to make it even less threatening by connecting it to common sense and "the home." The introduction to the exhibition suggests all this in a few sentences:

> This is an exhibition which looks inside nature. It shows the processes, living and dead, by which nature works. Here is the world for all to see, built transparently from the clear ideas of science. This exhibition is meant to make you feel at home with the knowledge of science, and to make you take pride in it, because it shows science as it is—fascinating, yes, but real and downright.[27]

Like the *Festival* itself, the science exhibition was given a narrative structure to convey its information; also like the *Festival*, though, as a consequence it had to relate abstract concepts to each other in a plot-like form: growth from small to large, inside to outside. According to scientist and caption writer Jacob Bronowski, in order to prepare the spectator for the telling of this story, and to make him or her "receptive," the first five rooms of the exhibition were purely visual, intentionally soliciting a more visceral response, and supposedly jolting the suppliant spectator into an eager search for knowledge. From the plunge into the darkness of the first five rooms full of visual stimuli, the experience of meeting atoms eye-to-eye, the spectator's familiarization with science and technology continues through the more overtly didactic efforts of models, charts, and explanatory texts.

26. Jacob Bronowski, "Exhibition of Science, South Kensington," guide-catalog, reproduced in *A Tonic to the Nation*, p. 144.
27. Ibid.

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The previously quoted introductory text focuses on the shrinking of the spectator, not the magnification of the cells, thereby eerily animating the experience and shifting the focus from the display to the viewer. It is as if the visitor him/herself is undergoing a transformation during this visual reconnaissance: "... and then the last step, you are ten thousand million times smaller than you began, and now you see into the atoms themselves."[28] The strategy of physical analogy, of creating microscopic, macroscopic, or simply otherworldly realms to inhabit, is not unlike the immersionary displays Hamilton used for most of his exhibitions. *Growth and Form,* for example, with its microscopic images of sea-urchin eggs enlarged over life-size, of the visual sparring match of spiral nebulae (cat. no. 3), electron-micrographs of smoke (cat. no. 14) and a horse's skull (cat. no. 79) created just such a visceral space.[29] Both exhibits use a sense of dislocation in order to destabilize the viewer enough so that he or she will have to leave behind perceptual prejudices and begin to see "correctly."

In order to familiarize the viewer both at a conscious and, one assumes, at an unconscious experiential level, the science exhibition not only had as its manifest content the accessibility and "naturalness" of scientific knowledge, symbolized by the atom, the crystal, or chemical element, but sought to foster a visceral familiarity—encouraging perhaps an inherently uncanny recognition of the very building blocks of the human body and brain—by immersing the spectator in the concretized shapes of these elements. The entire exhibition, from display walls to lamp fixtures, was based on shapes taken from cell structures and the atom. The designer explained his rationale in formal terms: "[the] hexagonal grid was a common unit of pattern in the exhibition, as it represented the pattern of the atoms of carbon. The lighting feature was also intended to illustrate further this atomic structure of matter." And, "the little foyer to the cinema had specially designed fabrics based on crystal structure diagrams."[30] Yet the festival-wide theme of crystalline and atomic structures (even inspiring specially designed textiles and wallpapers) must be understood in context with the *Festival*'s advocacy of science and technology's familiarity and everyday usefulness.

The catalog of the science exhibition adopts a dreamlike tone to precipitate the fantasmatic quality of the five "visual" rooms intended to prepare the viewer: "Going through these rooms you seem to shrink like Alice in Wonderland, and

28. Ibid.

29. Most of Hamilton's exhibitions in the 1950s create such environments for the spectator to inhabit, but the degree of engagement differs. *Man, Machine, and Motion,* like *Growth and Form,* was all-encompassing although the images were more technological; his contribution to *This Is Tomorrow,* with Group Two, created an environment both of visual, as well as olfactory, auditory, and tactile stimuli; his collaborative exhibitions with Victor Pasmore, *An Exhibit* and *An Exhibit II,* were entirely abstract.

30. Brian Peake, "Exhibition of Science, South Kensington" guide-catalog, p. 146.

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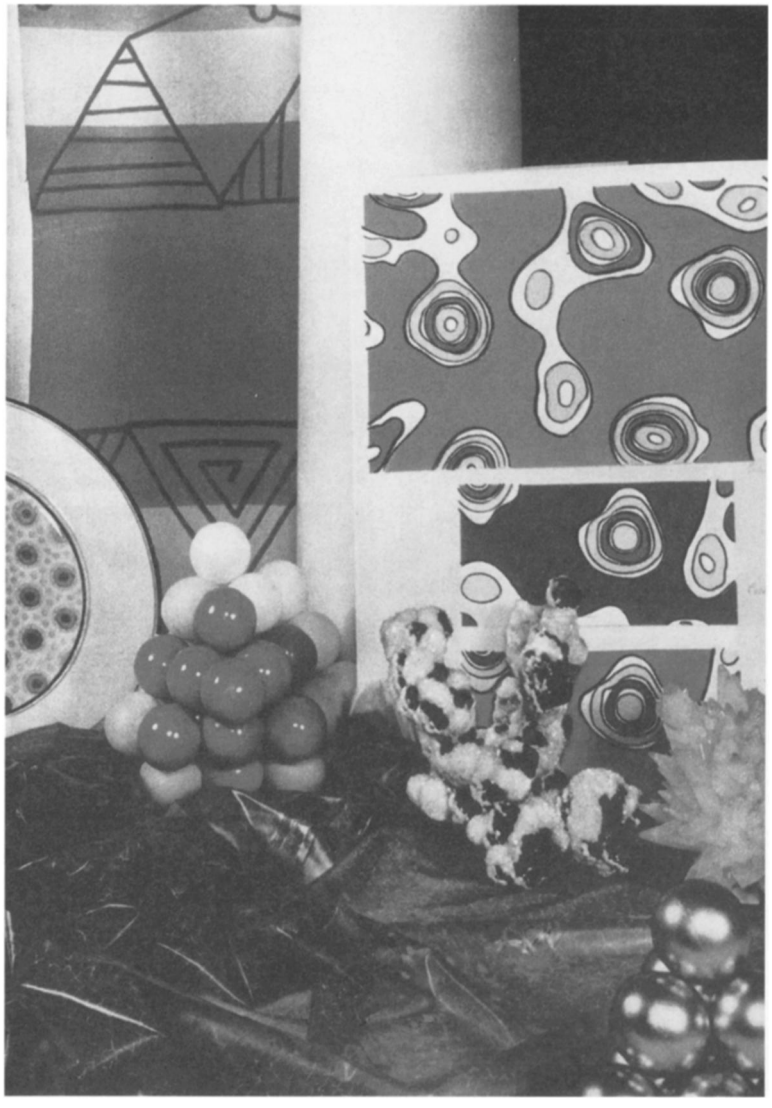

Decorative patterns based on crystallography, developed by the Festival Pattern Group. Top left: wallpaper by John Line & Sons, based on crystal structure of mica. Middle left: decoration for pottery by Peter Wall, based on the crystal structure diagram of hemoglobin. Right: dress prints by British Celanese, based on the diagram of afwillite. Foreground: PVC sheeting by Mary A. Harper for the Dunlop Rubber Company, based on the diagram of insulin.

the things round you seem to grow larger and larger . . . ," until "you have been plunged headlong through these five rooms into the structure of matter, and are now ready to see, in a more leisurely way, how we come to know about it."[31] The sense of drama and excitement, paired with measured didacticism, once again perfectly captures the *Festival*'s tone of gentle pedagogy. But there also seems to be an inkling in those sentences of the power of images, an acknowledgment perhaps of having done violence to the visitor by subjecting him or her to such an

31. Bronowski, "Exhibition of Science," p. 144.

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experience, as now a "more leisurely," meaning, perhaps, less aggressive, approach is possible, whereas the rush of images didn't allow a measured intake before. It is reminiscent of Hamilton's comment that he wants to "force" the spectator to see, to see what he wants him or her to see, it is implied, and, of course, to see it *correctly.*

After this visual preparation, the more overtly didactic narrative section of the exhibit, the "story," begins, excitedly, with the atom and its role in the "Physical and Chemical Nature of Matter":

> Matter is made of atoms, and there are over 90 kinds of atoms, because there are over 90 elements, each made of atoms of one kind. . . . We see how these elements make up the earth's crust, and we have a glimpse of the inner structure of the atoms themselves.[32]

On show is the micro and the macro, united by the atom, with rocks, crystals, radioactive atoms, alloy, and carbon compounds filling the in-between. From the building block of matter, and organic matter at that, the "story" continues with "The Structure of Living Things":

> It shows how [plants and animals] are built up from cells which live and multiply and die. The factors of heredity lie curled up within these cells, and when a male and a female sex cell unite, these factors show themselves in the descendants. So the plant or animal grows and fulfills itself, shaped jointly by its heredity and its environment.[33]

Again the text carefully touches on sensitive topics of the period: the concept of heredity had been blackened by national socialist insistence on racial "purity" and medical experiments; and the influence of the environment, milieu theory, a powerful underlying principle of the welfare state and a widely discussed topic since much of the welfare state's social policy—but also several of the social anxieties of the period, such as the heated discussions about neglectful mothers and their delinquent children—were based on the belief that the "the environment" is a powerful socializing influence. But while in the five "visual" rooms associations between cell structures, plant and animal life, and man were encouraged, here they are only implied. Perhaps because the *Festival*'s organizers were advocating strict avoidance of political terms and class-based discussions, an extension of the principles of heredity and environment is left unsaid.

The narration of the story of science continued in the third section: from "matter" to "life," the visitor's view here was directed to the outside world and s/he encountered "the latest topics of research in science, and how they have grown naturally from the underlying ideas which we have met on our way round," exem-

32. Ibid., p. 144.
33. Ibid., pp. 144, 146.

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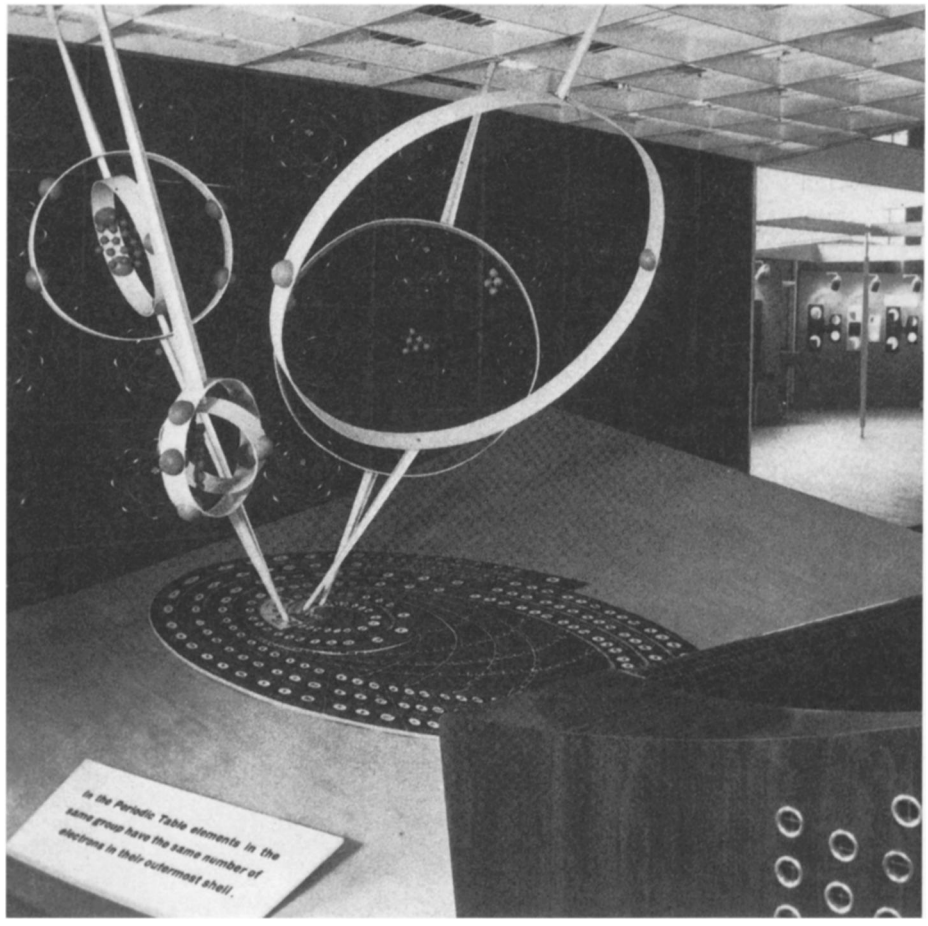

plified by topics such as "cybernetic turtles," "an electronic brain," and "penetrating rays which reach us from outer space." The emphasis still is on the root of human life in science: "the processes and structures on which life is based,"[34] but with its star maps and planetary models, the last section of the exhibit, entitled "Stop Press," charted a future in space.

As with the overall story line of the *Festival*, the assumption holds that if told in the right way, there is a right, and inevitable, way in which to understand the story. It is the story of "the modern world itself, standing straight and handsome on its base of science."[35] What could be more natural? The combinations of pedagogical display models, mixing verbal explanation with visual representations and a kind of formal immersion therapy, will create a meaning, which will be commu-

34. Ibid., p. 146.
35. Ibid., p. 144.

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Ronald Dickens. Periodic Table of the Elements. Display at Science Exhibition, *Science Museum, South Kensington. 1951.*

nicated to the spectator, consciously or not, and thereby have a direct impact on the spectator's rational being and condition his/her visual imagination—hence familiarizing science and making him/her understand and feel that "science is knowledge."[36]

It is intriguing to imagine the *Growth and Form* exhibition had it taken place on such a grand scale as the South Kensington exhibit, or simply on the scale Hamilton first envisioned in his draft schedule of February 20, 1950. As it happened, the exhibit was limited to one room at the ICA's recently opened Dover Street location, but even in this single continuous space, Hamilton sought to create separate environments by using contrasts in lighting, controlling the flow of visitors through the room, and by inserting visual barriers and framing devices in the room.

It is difficult, though, to get a clear sense of the effect. There is only one installation shot, which shows about a quarter of the exhibition room. It does picture several of the key elements of Hamilton's show: the open-frame and panel structure that he used to display images and small models; the oval-shaped construction near the center of the space, which housed optical devices such as projectors and strobe lights; and the skeletal structure David Mellor calls a "sight screen." By viewing this photo in combination with the floor plan, one can get perhaps some idea of the claustrophobic quality, noted in contemporary accounts, that the displays may have created.

Prominent in the existent installation shot is the "sight screen," a wire armature covered in plaster to approximate an organic growth, reminiscent of corals or bone. This roughly hewn set of uneven squares frames, both in this photograph and in the exhibition space one would have entered, a very much man-made grid: the open-frame and panel construction, made from delicate and smooth horizontals and vertical supports, describing a perfect cube and made up of perfect cubes. Inside this cubic structure several small models of "minute organisms, radiolaria and sponges illustrated in Thompson's book"[37] continue to draw attention to the similarity and difference of man-made geometry and organically grown form, calling to mind Gould's summary of Thompson's theory: the consanguinity of organic form and ideal Greek geometry.

The open-frame and panel display central to *Growth and Form* was a format Hamilton also used for his later show, *Man, Machine, and Motion.* This kind of display too was a leftover from the years of small-scale exhibitions put on during the war, which were often, like the trade fairs after the war, traveling, and therefore were designed with mobility and flexible adjustments to various sites in mind. Because

36. Ibid.
37. David Mellor, "The Pleasures and Sorrows of Modernity: Vision, Space and the Social Body in Richard Hamilton," in *Richard Hamilton* (London: Tate Gallery, 1992), p. 30.

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of its light weight and inexpensiveness, this method of display was much in vogue in post-World War II exhibition design.[38] But for Hamilton it also allowed creation of artificial environments by visually closing off separate spaces. In *Growth and Form*, though, the display itself becomes a part of the exhibition, as it plays off against the organic forms, both of the "sight screen" and the models it frames. Whereas the displays stood for a kind of makeshift modernity and progressiveness in context with the wartime propaganda photo exhibitions, here they come to stand for science and ideal form, for geometry and reason.

The three-dimensional grid, then, is used to display models and images in a carefully arranged spatial construction that nonetheless allows for quite a bit of transparency; consequently the wall behind, with its giant, over-life-size X-rayed image of the bones of a hand, is visible both above the grid and through empty spaces in it. This transparency adds to the multilayered view created across the exhibition space: from the microscopic, enlarged into small-scale models, the emphasis shifts to the monstrous here, as the skeletal hand adds another layer of contrasting form to the various grids; here the human form itself (and its forming limb), not only the geometric forms created by humanity, stand in dialogue with other organic matter, other skeletons.

The eeriness of the X-rayed hand reaching across the entire side wall is heightened by the darkness that lingers over the space. On the left side the photo is framed by part of the oval construction housing strobe lights and other optical devices; a "lenticular stand," in David Mellor's reading, representing "a pun on the overall eye shape of the stand that was projecting a world as well as being the gazed-at target."[39] The effects of the film projections and other optical stimuli are impossible to reconstruct, as little is left to attest to this part of the show except scant accounts and the catalog listing exhibits. Clearly, though, one of these projections—the developing sea-urchin eggs (cat. no. 32)—particularly contributed to the sense of dislocation and spatial/dimensional confusion reported by some visitors. It is not only form but, as in the Science exhibition, the inclusion of vastly different dimensions of size that call the spectator's attention to his or her own role in this environment. Unlike the South Kensington exhibit, however, Hamilton is not constructing any kind of linear narrative. In the Science exhibit the shifts in scale were consecutive, not simultaneous. Like the Science exhibition, *Growth and Form* sought to bring the realm of the microscopic closer to human consciousness, but while *Growth and Form* targeted the spectator's vision and hoped to create an affinity with the forms and structures found in nature and ordered by science, the Science exhibition aimed for a more visceral, experiential level of familiarity. Both exhibitions used photographic imagery and the creation

38. See, for example, Francesco Gnecchi Ruscone's *Mostra degli Studi sulle Proporzioni* at the ninth Milan Triennale in 1951.
39. David Mellor, "The Pleasures and Sorrows of Modernity," p. 30.

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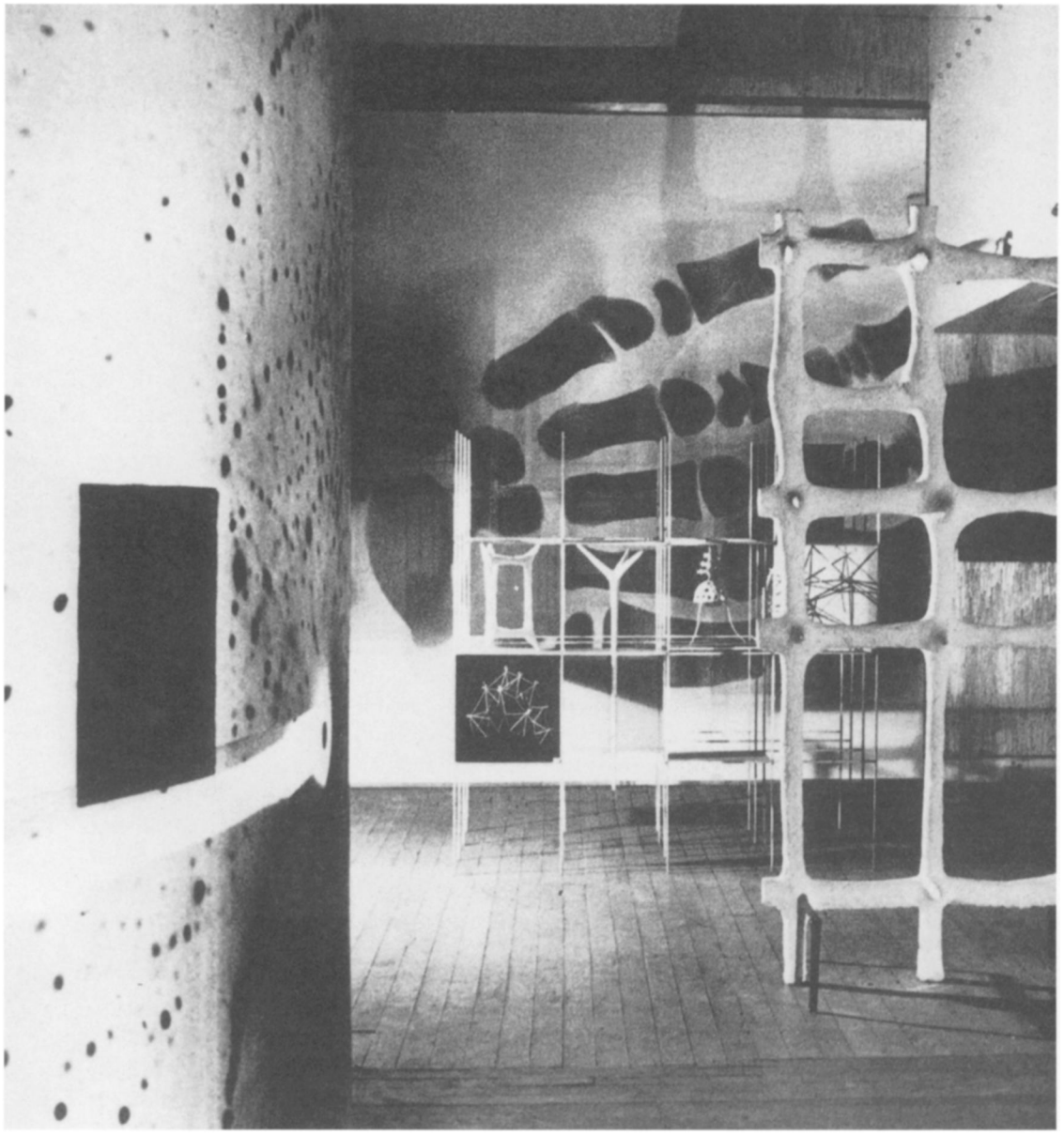

Installation view of Growth and Form *exhibition. Institute of Contemporary Arts, London. 1951.*

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of artificial environments to provoke an experience from the spectator, yet, though perhaps more visceral, the Science exhibition sought to have both an emotional and an intellectual effect: it strove to make science appear "friendly" but at the same time emphasize its objective quality and free it from tainted associations. For this purpose the Science exhibition, like the *Festival* overall, used not only an overt narrative but much verbal commentary to accompany the images and models. Unlike Hamilton, who did not include explanatory labels, the organizers of the Science exhibit were not entirely relying on the power of their imagery; as they hint in their text, they used the images to "prepare" the visitor for a more measured intake. Their assumption is that vision cannot be refused, and that the identification and formal familiarity created by the immersion in scientific imagery will create a "natural" interest in understanding this experience on a cognitive level as well. The images, and visual perception itself, then, are understood to have an unmediated impact and to condition the spectator for the next step in which audience participation is needed: reading.

Hamilton's assumptions are very similar in his reliance on visual immediacy in order to visualize Thompson's theories. The formal correspondences between the models and the imagery are presumed to "speak for themselves." Minutes of a 1950 meeting of the exhibition subcommittee state that Hamilton was quite clear about this; they note that, "Mr. Hamilton pointed out that the Exhibition will be entirely self-explanatory visually, and will require no captions."[40] Since his didactic goals are different—namely forcing the spectator to *see* differently, not necessarily to *feel* differently—Hamilton can dispense with words, yet the sensory stimulation with which he afflicted the spectator and which elicited feelings of claustrophobia and dislocation must also be seen as part of an emotion-based reaction. How does this corporeal notion, emphasized by the need to create an environment that would subjugate the viewer (i.e., a forced route, difficulties seeing in the dark, optical illusions) then relate to the assumption of visual perception as arbiter of truth? How can forcing the visitor to see be enough when in order for this force to be exerted the emotional ground needs to be prepared, the spectator's familiar visual field needs to be shattered? Like Nelson, Hamilton is trying to re-educate the visual sense by jolting the viewer into new territory; but if "habits" can keep one from seeing, then how can vision be accredited this awesome quality of directness in the first place? Even as Hamilton continued his exhibition work, creating in *Man, Machine, and Motion* and *This Is Tomorrow* environments to destabilize vision and call attention to its deceptiveness, a belief in the immediacy of optical sense perception and in the ability to communicate precise meaning persisted in his own work.

40. "Minutes of a meeting of the *Growth + Form Exhibition* Sub-committee held on Tuesday, January 31, 1950 at 4 p.m. at 6 Fitzroy Street, W 1," ICA Papers, Tate Gallery Archive, TGA 955.1.12.26.

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